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| 09/777,976 | 02/06/2001 | Wesley M. Enroth | EN9-98-072US2 | 3360 |

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EXAMINER

CHANG, RICK KILTAE

ART UNIT PAPER NUMBER

3729

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/777,976

Applicant(s)

ENROTH ET AL.

Examiner

Rick K. Chang

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5,6,8,10,12,13,15,16 and 21-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,6,8,10,12,13,15,16 and 21-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by.

Amago discloses in Fig. 12 with a solder resist 107 provided on the bottom of the PCB to obstruct molten solder. 2 is a conductive lining and 5 is cured.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5-6, 8, 10, and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amago et al (US 5,402,314) in view of Majd (US 5,155,904).

Amago discloses placing and fixing top and bottom components (Fig. 2), lining an interior wall of the via (2), Fig. 9 shows 2 at the end of the bottom surface.

Amago fails to disclose wave soldering and providing leaded components.

Majd discloses wave soldering (Fig. 1) and providing leaded and PIH components (44, 46, 53, 54 and 55).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Amago by wave soldering and providing leaded and PIH components, as taught by Majd, for the purpose of increasing production by mass soldering IC components.

5. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sabotke et al (US 5,737,834) in view of Nakaso et al (US 5,638,598), and further in view of Lauffer et al (US 5,867,898).

Sabotke discloses in Fig. 1 steps of applying solder paste, reflow soldering components, and fixing a second component onto the PCB. In light of the claimed invention, Sabotke's components mounted on the top surface will be the bottom components mounted in the claimed invention, and vice versa.

Sabotke fails to disclose providing a PCB having a soldered via electrically communicating between layers as well as top to bottom layers and screen printing solder.

Nakaso discloses in Fig. 3 a solder plug in a via formed in a PCB.

Lauffer discloses in claim 8 screening the solder paste.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sabotke by providing a PCB having a soldered via electrically communicating between layers as well as top to bottom layers and screen printing solder, as taught by Nakaso and Lauffer, for the purpose of allowing forming densely formed contacts to electrically communicate between layers and top and bottom surfaces, as well as increase production by mass soldering a plurality of vias and pads.

It is inherent that when a solder mass is reflowed, the solder mass in the via will be melted and reformed and redistributed.

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6. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sabotke et al (US 5,737,834)/Nakaso et al (US 5,638,598)/Lauffer et al (US 5,867,898) as applied to claims 12-13 above, and further in view of Majd (US 5,155,904) and Thompson, Jr. (US 5,704,535).

Sabotke/Nakaso/Lauffer fail to mount PIH components and wave soldering with shielding.

Madj discloses mounting PIH components in Figs 8-9.

Thompson discloses shielding the board during wave soldering (Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sabotke/Nakaso/Lauffer by mounting PIH components and shielding the board during wave soldering, as taught by Madj and Thompson, for the purpose of performing desired operation and protecting the sensitive parts of the board.

Response to Arguments

7. Applicant's arguments filed 9/23/03 have been fully considered but they are not persuasive.

Fig. 12 shows 107 forms a plug in the via 105.

104 is mounted on the top surface of 102 and 107 obstructs flow of the molten solder into the via during soldering.

Sabotke discloses in Fig. 1 steps of applying solder paste, reflow soldering components, and fixing a second component onto the PCB. In light of the claimed invention, Sabotke's components mounted on the top surface will be the bottom components mounted in the claimed invention, and vice versa. Sabotke fails to disclose providing a PCB having a soldered via electrically communicating between layers as well as top to bottom layers and screen printing

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solder. Nakaso discloses in Fig. 3 a solder plug in a via formed in a PCB. Lauffer discloses in claim 8 screening the solder paste. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sabotke by providing a PCB having a soldered via electrically communicating between layers as well as top to bottom layers and screen printing solder, as taught by Nakaso and Lauffer, for the purpose of allowing forming densely formed contacts to electrically communicate between layers and top and bottom surfaces, as well as increase production by mass soldering a plurality of vias and pads.

Interviews After Final

8. Applicant note that an interview after a final rejection must be submitted briefly in writing the intended purpose and content of the interview (the agenda of the interview must be in writing). Upon review of the agenda, the Examiner may grant the interview if the examiner is convinced that disposal or clarification for appeal may be accomplished with only nominal further consideration. Interviews merely to restate arguments of record or to discuss new limitations will be denied. See MPEP 714.13 and 713.09.

Conclusion

9. Please provide reference numerals (either in parentheses next to the claimed limitation or in a table format with one column listing the claimed limitation and another column listing corresponding reference numerals in the remark section of the response to the Office Action) to all the claimed limitations as well as support in the disclosure for better clarity. Applicants are duly reminded that a full and proper response to this Office Action that includes any amendment to the claims and specification of the application as

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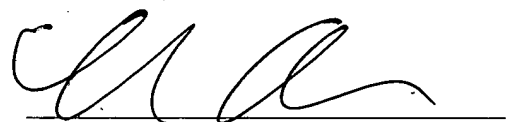
originally filed requires that the applicant point out the support for any amendment made to the disclosure, including the claims. See 37 CFR 1.111 and MPEP 2163.06.

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick K. Chang whose telephone number is (703) 308-4784. The examiner can normally be reached on 5:30 AM to 1:30 PM, Monday through Thursday.

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9302 for regular communications and (703) 872-9303 for After Final communications.

A handwritten signature in black ink, appearing to be 'Richard Chang', written over a horizontal line.

**RICHARD CHANG
PRIMARY EXAMINER**